

WHAT IS CLAIMED IS:

1. A method of fabricating a nitride based semiconductor substrate, comprising the steps of:

depositing a first nitride based semiconductor layer on a base;

processing the first nitride based semiconductor layer to have ridge portions and recess portions;

coating side surfaces of the ridge portions and bottom surfaces of the recess portions with an amorphous insulating film;

growing a second nitride based semiconductor layer on a region of the first nitride based semiconductor layer other than a region thereof coated with the amorphous insulating film, the region of the first nitride based semiconductor layer serving as seed crystal; and

separating the second nitride based semiconductor layer from the ridge portions by irradiating the region corresponding to the seed crystal with a laser beam.

2. The method of fabricating a nitride based semiconductor substrate according to Claim 1, further comprising the step of thermally annealing the base with the first and second nitride based semiconductor layers deposited thereon, before the separating step.

3. The method of fabricating a nitride based semiconductor substrate according to Claim 1, wherein the laser beam has a wavelength of 190nm to 550nm.

4. The method of fabricating a nitride based semiconductor substrate according to Claim 1, wherein the ridge portions are ridge stripes and a direction of the stripes is a  $\langle 1 - 100 \rangle$  direction

of nitride.

5. A method of fabricating a nitride based semiconductor device, comprising the steps of:

- depositing a first nitride based semiconductor layer on a base;
- processing the first nitride based semiconductor layer to have ridge portions and recess portions;
- coating side surfaces of the ridge portions and bottom surfaces of the recess portions with an amorphous insulating film;
- growing a second nitride based semiconductor layer on a region of the first nitride based semiconductor layer other than a region thereof coated with the amorphous insulating film, the region of the first nitride based semiconductor layer serving as seed crystal;
- depositing a layer having an active layer structure with an active layer interposed between semiconductor layers of different conductivity types, on the second nitride based semiconductor layer; and
- separating the second nitride based semiconductor layer from the ridge portions by irradiating the region corresponding to the seed crystal with a laser beam.

6. A method of fabricating a nitride based semiconductor substrate, comprising the steps of:

- depositing a first nitride based semiconductor layer on a base;
- depositing a second nitride based semiconductor layer on the first nitride based semiconductor layer;
- processing the first and second nitride based semiconductor layers to have ridge portions and recess portions;
- coating side surfaces of the ridge portions and bottom surfaces of the recess portions with an amorphous insulating film;

growing a third nitride based semiconductor layer on a region of the second nitride based semiconductor layer other than a region thereof coated with the amorphous insulating film, the region of the second nitride based semiconductor layer serving as seed crystal; and

separating the second nitride based semiconductor layer from the ridge portions by irradiating the region corresponding to the seed crystal with a laser beam.

7. The method of fabricating a nitride based semiconductor substrate according to Claim 6, further comprising the step of depositing a layer having an active layer structure with an active layer interposed between semiconductor layers of different conductivity types, on the third nitride based semiconductor layer, before the separating step.

8. The method of fabricating a nitride based semiconductor substrate according to Claim 6, further comprising thermally annealing the base with the first, second, and third nitride based semiconductor layers deposited thereon, before the separating step.

9. The method of fabricating a nitride based semiconductor substrate according to Claim 6, wherein the ridge portions are ridge stripes and a direction of the stripes is a  $\langle 1 - 100 \rangle$  direction of nitride.

10. The method of fabricating a nitride based semiconductor substrate according to Claim 6, wherein the laser beam has a wavelength of 190nm to 550nm.

11. The method of fabricating a nitride based semiconductor substrate according to Claim 6, wherein the second nitride based semiconductor layer is comprised of semiconductor compound containing three or more elements belonging to III-V groups.

12. The method of fabricating a nitride based semiconductor substrate according to Claim 6, wherein the second nitride based semiconductor layer has bandgap smaller than bandgap of the third nitride based semiconductor layer.

13. The method of fabricating a nitride based semiconductor substrate according to Claim 11, wherein the second nitride based semiconductor layer contains at least As.

14. The method of fabricating a nitride based semiconductor substrate according to Claim 11, wherein the second nitride based semiconductor layer contains at least In.

15. The method of fabricating a nitride based semiconductor substrate according to Claim 11, wherein the second nitride based semiconductor layer contains at least P.

16. A method of fabricating a nitride based semiconductor device, comprising the steps of:

depositing a first nitride based semiconductor layer on a base;

depositing a second nitride based semiconductor layer on the first nitride based semiconductor layer;

processing the first and second nitride based semiconductor layers to have ridge portions and recess portions;

coating side surfaces of the ridge portions and bottom surfaces of the recess portions with an amorphous insulating film;

growing a third nitride based semiconductor layer on a region of the second nitride based semiconductor layer other than a region thereof coated with the amorphous insulating film, the region of the second nitride based semiconductor layer serving as seed crystal;

depositing a layer having an active layer structure with an active layer interposed between semiconductor layers of different conductivity types, on the third nitride based semiconductor layer; and

separating the second nitride based semiconductor layer from the ridge portions by irradiating the region corresponding to the seed crystal with a laser beam.